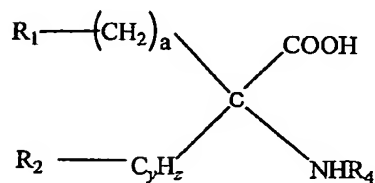


We Claim:

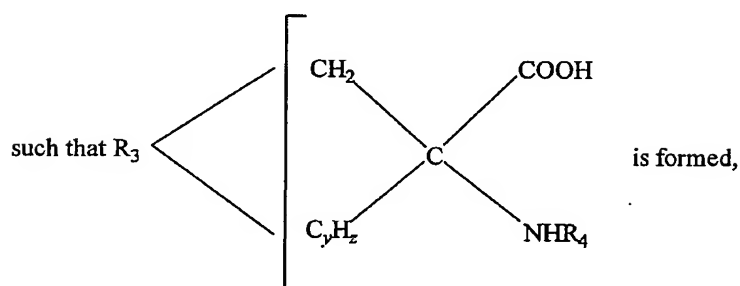
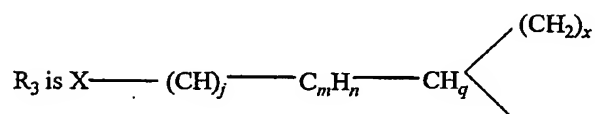
1. An amino acid analog having the general structure



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where R_1 is X, $\text{X} - \text{HC} = \text{CH} -$, or R_3

R_2 is H, or R_3 if R_1 is R_3 .



R_4 is $-(\text{C}_k\text{H}_{2k+1})$, $-(\text{C}_k\text{H}_{2k-1})$ or $-(\text{C}_k\text{H}_{2k-3})$

And where a is 1 to 5,

x is 0 or 1,

y is 1 or 2,

z is 1, 2, 3 or 4 and $z > y$ if y is 2,

q is 1 or 0 if n is 1 and j is 0,

n is 1 or 2, but 0 if m is 0,

m is 0 or 1

j is 0, 1, 2 or 3

k is 1-5 and

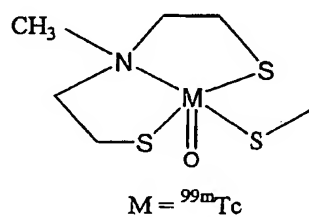
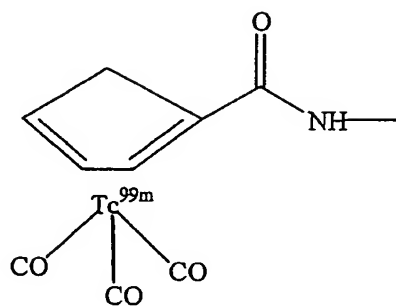
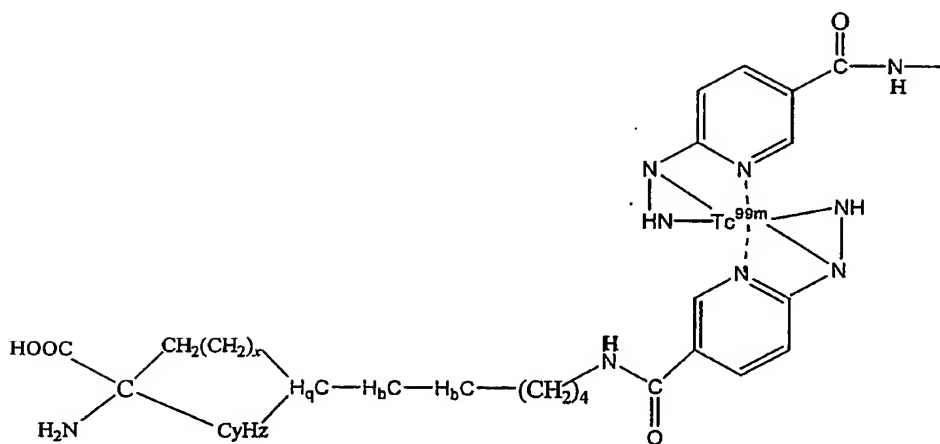
X is ^{18}F , ^{123}I , ^{124}I , ^{125}I , ^{131}I , ^{75}Br , ^{76}Br , ^{77}Br , ^{82}Br , or At

2. The compound of claim 1, wherein R_1 and R_2 are R_3 .
3. The compound of claim 1, wherein x is 0
 - y is 1
 - z is 2
 - 5 q is 1
 - m is 0 and j is 0.
4. The compound of Claim 3, wherein X is ^{18}F or ^{123}I .
5. The compound of Claim 3, wherein X is ^{18}F .
6. The compound of Claim 1, wherein R_1 and R_2 are R_3 ,
 - 10 x is 0 or 1
 - y is 2
 - z is 4
 - q is 1
 - m and j are 0 and X is ^{18}F or ^{123}I .
- 15 7. The compound of claim 6, wherein x is 1 and X is ^{18}F .
8. The compound of Claim 6, wherein x is 0 and X is ^{123}I .
9. The compound of Claim 6, wherein x is 1 and X is ^{123}I .
10. The compound of Claim 1, wherein R_1 and R_2 are R_3 ,
 - x is 0
 - 20 y is 1
 - z is 2
 - q is 0
 - m is 1
 - n is 1
 - 25 j is 0 and X is ^{18}F or ^{123}I .
11. The compound of claim 10, wherein X is ^{18}F .

12. A compound according to claim 1 wherein R_1 and R_2 are R_3 ,
x is 1
y is 1
z is 1
5 q is 0
m and j are 0, and
X is ^{18}F or ^{123}I .
13. A compound according to claim 12 wherein X is ^{123}I .
14. A compound according to claim 1 wherein R_1 and R_2 are R_3 ,
10 x is 0
y is 1
z is 2
q is 1
m is 1
15 n is 1
j is 1, and
X is ^{18}F , or ^{123}I .
15. The compound of claim 14 wherein X is ^{123}I .
16. A compound according to claim 1 wherein R_1 and R_2 are R_3 ,
20 x is 0
y is 1
z is 2
q is 0
m is 0
25 j is 1, and
X is ^{18}F , or ^{123}I .
17. The compound of claim 16 wherein X is ^{123}I .

18. A compound according to claim 1 wherein R₁ and R₂ are R₃,
x is 0 or 1
y is 2
z is 4
5 q is 1
m is 1
n is 1
j is 1, and
X is ¹⁸F, or ¹²³I.
- 10 19. The compound of claim 18 wherein X is ¹⁸F.
20. The compound of claim 18 wherein X is ¹²³I.
21. A compound according to claim 1, wherein R₁ and R₂ are R₃,
x is 0 or 1
y is 2
15 z is 4
q is 0
m is 0
j is 1, and
X is ¹⁸F, or ¹²³I.
- 20 22. The compound of claim 21 wherein X is ¹⁸F.
23. The compound of claim 21 wherein X is ¹²³I.
24. A compound of claim 1 wherein R₁ and R₂ are not R₃.
25. A compound according to claim 24 wherein X is ¹⁸F.
26. A compound according to claim 1 wherein R₁ is X-CH=CH-, R₂ is H, y is 1 and z is
25 2.
27. The compound of claim 26 wherein X is ¹²³I.

28. The compound of claim 1 wherein R₁ and R₂ are R₃, where k is 1-5, j is 1, 2 or 3, m is 1, and X is


$$M = {}^{99m}\text{Tc}$$


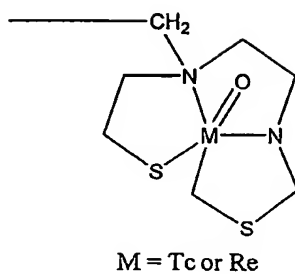
where b is 0, 1 or 2

x is 0 or 1

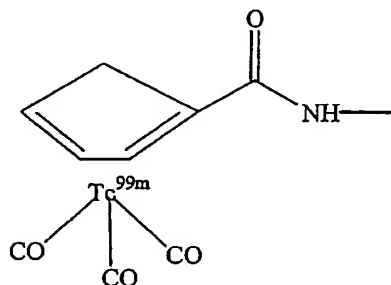
y is 1 or 2

z is 1, 2, 3, or 4 and $x > y$ if y is 2,

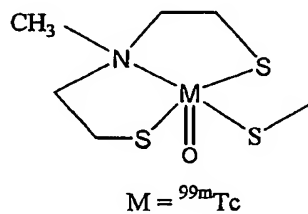
q is 0 or 1



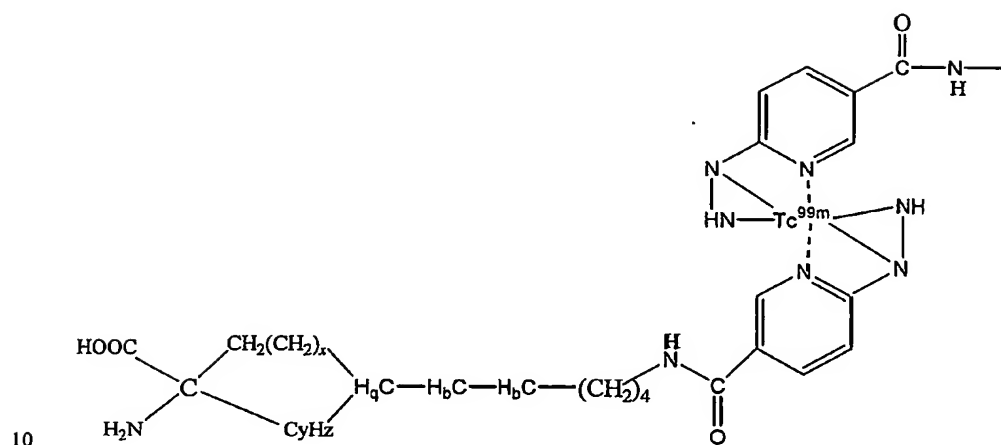
- 5 29. The compound of claim 28 wherein X is



30. The compound of claim 29 wherein j is 1, 2 or 3 and n is 0.
- 10 31. The compound of claim 29 wherein j is 1, 2 or 3 and n is 1.
32. The compound of claim 29 wherein j is 1, 2 or 3 and n is 2.
- 15 33. The compound of claim 28 wherein X is



34. The compound of claim 33 wherein j is 1, 2 or 3 and n is 0.
35. The compound of claim 33 wherein j is 1, 2 or 3 and n is 1.
36. The compound of claim 33 wherein j is 1, 2 or 3 and n is 2.
37. The compound of claim 28 wherein X is



where b is 0, 1 or 2

x is 0 or 1

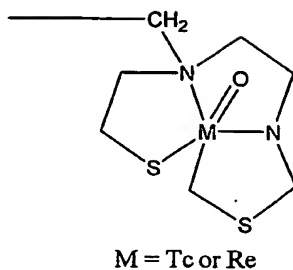
y is 1 or 2

z is 1, 2, 3, or 4 and $x > y$ if y is 2,

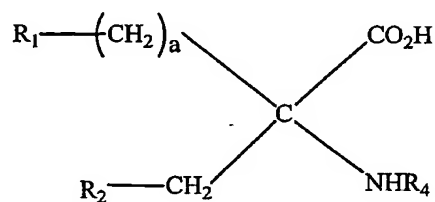
q is 0 or 1

38. The compound of claim 37 wherein j is 1, 2 or 3 and n is 0.
39. The compound of claim 37 wherein j is 1, 2 or 3 and n is 1.
40. The compound of claim 37 wherein j is 1, 2 or 3 and n is 2.

41. The compound of claim 28 wherein X is

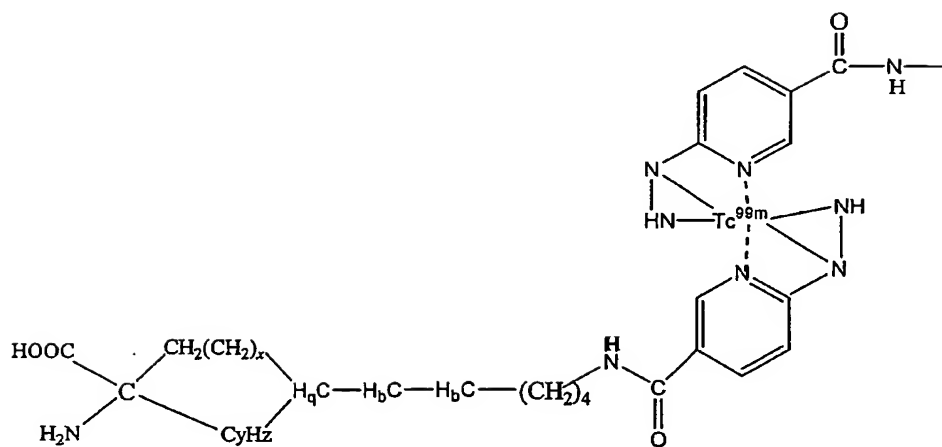
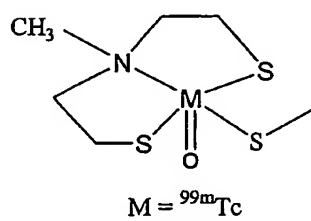
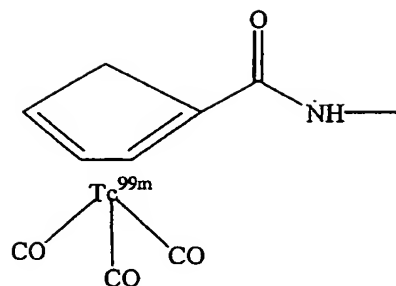


42. The compound of claim 41 wherein j is 1, 2 or 3 and n is 0.
- 5 43. The compound of claim 41 wherein j is 1, 2 or 3 and n is 1.
44. The compound of claim 41 wherein j is 1, 2 or 3 and n is 2.
- 10 45. The compound of claim 1, wherein R_1 is ^{18}F , R_2 is H, y is 1, z is 2, and R_4 is $-\text{CH}_3$.
46. An amino acid analog having the general structure



- 15 where R_1 is Z, a is 1 to 5,
and R_4 is $-(\text{C}_k\text{H}_{2k+1})$, $-(\text{C}_k\text{H}_{2k-1})$, or $-(\text{C}_k\text{H}_{2k-3})$, and
 R_2 is $-(\text{C}_k\text{H}_{2k+1})$, $-(\text{C}_k\text{H}_{2k-1})$, or $-(\text{C}_k\text{H}_{2k-3})$
k is 1-5.

Z is



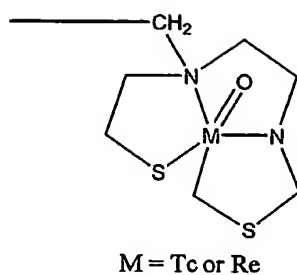
where b is 0, 1 or 2

x is 0 or 1

y is 1 or 2

z is 1, 2, 3, or 4 and $x > y$ if y is 2,

q is 0 or 1



47. A method of in situ tumor imaging by positron emission tomography comprising:

- 5 administering to a subject suspected of having a tumor an image-generating amount of a compound according to claim 1, and measuring the distribution of the compound in the subject by positron emission tomography.

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